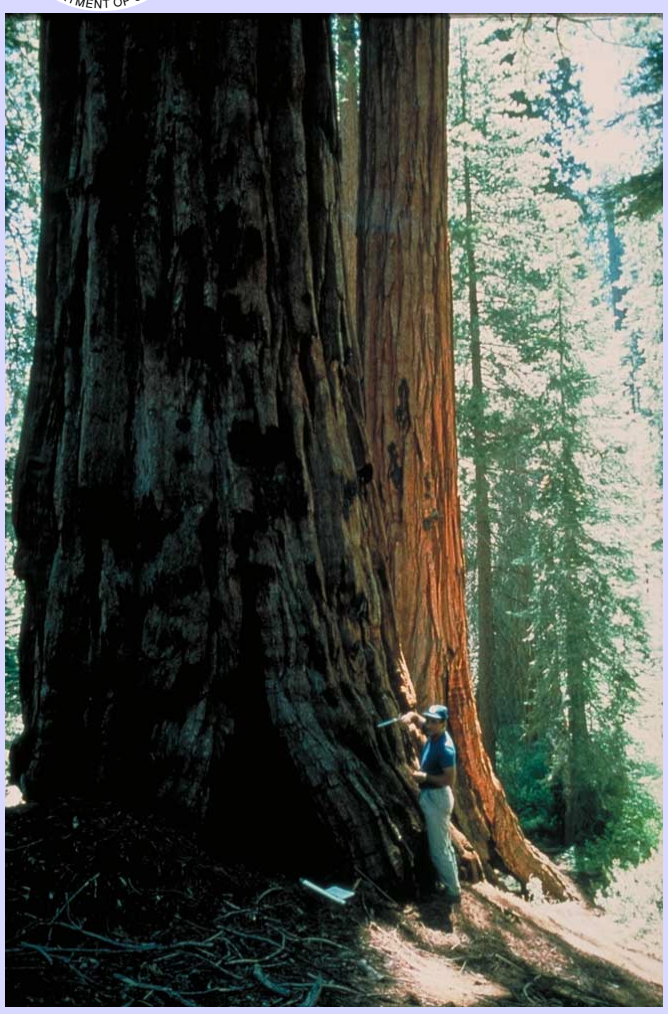
United States Department of Commerce, National Oceanic and Atmospheric Administration
National Environmental Satellite, Data, and Information Service

# National Geophysical Data Center (NGDC)

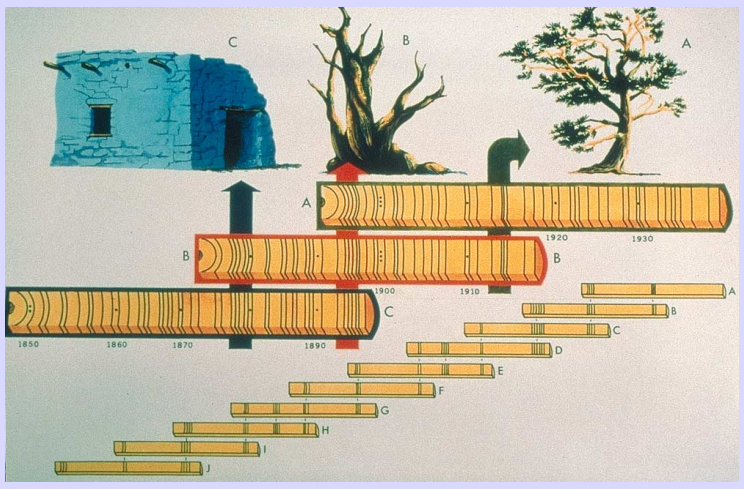


**The Giant sequoia (Sequoiadendron giganteum) is the largest tree species on earth.** *(above)*
Tree rings record the fluctuation of environmental factors that influence tree growth during the life of the tree. In many cases, trees grow to be hundreds or even thousands of years old and thus are an important source of information about environmental change. Instrumental records of climate or other types of environmental variations exist for less than 100 years in most parts of the world. This length of record is not sufficient to answer questions such as: Is current global warming unusual, or is it part of the natural climate variability that we can expect over the long term? What is the range of precipitation variability that can be expected over centuries and millennia? With the climate information stored in tree rings, we can begin to answer such questions.

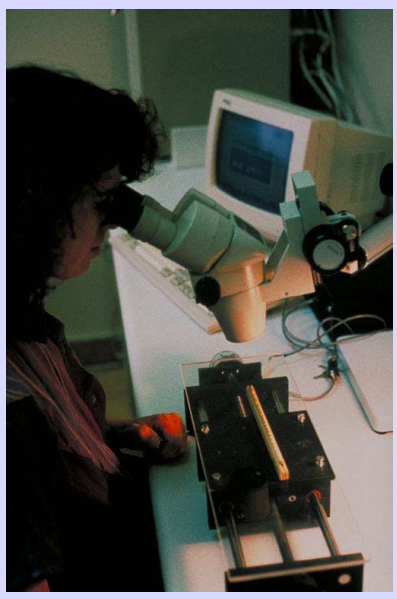
Photo Credits:
Peter Brown
Rocky Mountain Tree-Ring Research, Ft. Collins, CO

## Paleoclimatology studies at NGDC:

## The Trees Tell Tales




**Extending a chronology based on living trees further back in time through crossdating** *(above)*
Dendrochronology is the analysis of tree rings, including the dating of annual rings and study of patterns of ring characteristics, such as widths, density, and isotopic composition. In mid- to upper latitudes, or areas where there is seasonality in temperature and/or precipitation, many species of trees form annual growth rings. Because the same set of environmental factors influence tree growth throughout a region, the patterns of ring characteristics, such as ring widths, are often common from tree to tree. These patterns can be matched between trees in a process called crossdating, which is used to assign exact calendar year dates to each individual ring. Dated and measured rings from a number of trees in a region are combined to form a tree-ring chronology.



**Measuring a tree-ring core on a moveable-stage microscope.** *(left)*
Once all rings are accurately crossdated, the ring widths in each sample are measured under a microscope on a sliding stage micrometer accurate to the nearest 0.01mm, and recorded in computerized data files. Other techniques are used to measure ring density and isotopic composition. This slide shows a microscope and measuring machine connected to a computer. Ring boundaries can be viewed through the microscope. A core on the stage of the machine is measured using a hand crank (near end of the stage) to move the stage with the core one ring width at a time. Once the measurement is made, an encoder converts the movement of the platform into a distance signal. The signal is converted into a width measurement, and recorded in a file in the computer.

Photo Credits:
Elaine Kennedy Sutherland
U.S.D.A. Forest Service, Delaware, OH

**February 2002**

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**January**

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**March**

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Underlying scientific data viewable at: **http://www.ngdc.noaa.gov/ngdc.html**